

## Louisiana Standards for Water Works Construction, Operation and Maintenance Committee

### ***Subcommittee Report***

Part 2: General Design Considerations

Report Date: April 8, 2014

Chair: Dirk Barrios

Members: Chris Richard, Keith Shackelford

All Present: Sidney Becnel, Don Denova, Craig Gautreaux, Mike Sobert, Steven Davis

#### **Overview of Meeting Discussion:**

- Main discussion points:
  - a. Whether or not the standard applied to the Sanitary Survey or the design.
  - b. Whether or not standards are to be in the code.
- What occupied a lot of time
  - a. Whether or not DHH should get involved in the areas where there are other agencies that have jurisdiction over a product, construction, etc.
  - b. Standby power.
  - c. Laboratory facilities & testing equipment.
  - d. Piping color code.
  - e. Whether or not systems should be allowed to follow AWWA Standards for the disinfection of new and/or existing systems for construction and/or repairs.

#### **TOP TEN SUBCOMMITTEE RECOMMENDATIONS:**

### 2.3 BUILDING LAYOUT

Design shall provide for:

- a. adequate ventilation;
- b. adequate lighting;
- c. adequate heating;
- d. adequate drainage;
- e. dehumidification equipment, if necessary;

- f. accessibility of equipment for operation, servicing, and removal;
  - g. flexibility of operation;
  - h. operator safety;
  - i. convenience of operation;
  - j. chemical storage and feed equipment in a separate room to reduce hazards and dust problems.
- [Use as a Design Standard for a new system and not for Sanitary Survey.](#)
  - [There are areas where the regulating/governing authority should to have jurisdiction over, like safety, chemical storage and feed equipment in separate rooms.](#)

## 2.5 ELECTRICAL CONTROLS

Main switch gear electrical controls shall be located above grade, in areas not subject to flooding. All electrical work shall conform to the requirements of the National Electrical Code or to relevant state and/or local code.

- [Use as a Design Standard for a new system and not for Sanitary Survey.](#)
- [To be handled by regulating authority in permitting of construction.](#)

## 2.6 STANDBY POWER

- Dedicated standby power shall be required by the ~~reviewing authority~~ [State Health Officer](#) so that water may be treated and/or pumped to the distribution system during power outages to meet the average day demand. Alternatives to dedicated standby power may be considered by the ~~reviewing authority~~ [State Health Officer](#) with proper justification.
- [Alternatives to standby power should be allowed. Some systems have contracts with companies that provide generators when needed.](#)
- [Use as a Design Standard for a new system and for Sanitary Survey.](#)
- Carbon monoxide detectors ~~are recommended~~ [should be installed](#) when fuel-fired generators are housed.
- [Use as a Design Standard for a new system and for Sanitary Survey.](#)

## 2.8 LABORATORY FACILITIES

- Where laboratories are provided, Each public water supply system shall have its own equipment and facilities for the routine (daily) laboratory testing necessary to ensure the proper operation of the water supply system. Laboratory equipment selection shall be based on the characteristics of the raw water source, and the complexity of the treatment process involved, the contaminants or analytes for which monitoring is required or desired, and the particular laboratory methodology and minimum accuracy required to be performed for such contaminants or analytes. Laboratory test kits which simplify procedures for making one or more tests may be acceptable. An operator or chemist qualified to perform the necessary laboratory tests is essential. Other than those, analytes allowed to be analyzed in a DHH-OPH Approved Chemical Laboratory/Drinking Water (see Chapter 15 of this Part), Analyses conducted to determine compliance with drinking water regulations must shall be performed in an appropriately DHH-OPH -certified or a U.S. Environmental Protection Agency (EPA) certified laboratory in accordance with Standard Methods for the Examination of Water and Wastewater or approved alternative methods the requirements of this Part. Persons designing and equipping laboratory facilities ~~shall~~ should confer with the ~~reviewing authority~~ DHH-OPH before beginning the preparation of plans or the purchase of equipment. Methods for verifying adequate quality assurances and for routine calibration of equipment ~~should~~ shall be provided.
- Some systems contract out their operation and maintenance to other companies so they should not have to have laboratories.
- Use as a Design Standard for a new system and for Sanitary Survey.

### 2.8.1 Testing equipment

As a minimum, the following laboratory equipment shall be provided:

- ~~a. Surface water supplies shall provide the necessary facilities for microbiological testing of water from both the treatment plant and the distribution system. The reviewing authority may allow deviations from this requirement.~~
- ba. Surface water supplies systems or groundwater under the direct influence of surface water (GWUDISW) systems shall have a nephelometric turbidimeter meeting the requirements of Standard Methods for the Examination of Water and Wastewater the approved turbidity methods in Chapter 11 of this Part.

- ~~eb.~~ Each surface water treatment plant or GWUDISW plant utilizing flocculation and sedimentation, including those which lime soften, shall have a pH meter, jar test equipment, and titration equipment for both hardness and alkalinity.
- ~~ec.~~ Each ion-exchange softening plant, and lime softening plant treating only groundwater shall have a pH meter and titration equipment for both hardness and alkalinity
- ~~ed.~~ Each iron and/or manganese removal plant shall have test equipment capable of accurately measuring iron to a minimum of 0.1 milligrams per liter, and/or test equipment capable of accurately measuring manganese to a minimum of 0.05 milligrams per liter.
- ~~fe.~~ Public water supplies systems which chlorinate shall have test equipment for determining both free and total chlorine residual by the applicable methods listed in Standard Methods for the Examination of Water and Wastewater Table 1 of §1105.C of this Part.
- ~~gf.~~ If a public water system adjusts its fluoride level, ~~E~~equipment shall be provided for measuring the quantity of fluoride in the water. Such equipment shall be subject to the approval of the ~~reviewing authority~~ DHH-OPH.
- ~~hg.~~ Public water supplies systems which feed poly and/or orthophosphates shall have test equipment capable of accurately measuring phosphates from 0.1 to 20 milligrams per liter.
- h. Public water systems that use chlorine dioxide shall have an amperometric titrator with platinum-platinum electrodes capable of measuring chlorite to a minimum accuracy of plus or minus 0.05 milligrams per liter.
- i Surface water systems, GWUDISW systems, and any groundwater system required to or choosing to achieve a minimum CT value[residual disinfectant concentration ("C") times the contact time "T" when the pipe, vessel, etc., is in operational at or before the first customer shall have a method of measuring water temperature using a thermometer or thermocouple with a minimum accuracy of plus or minus 0.5 degrees Celsius (0.5°C).

- Use as a Design Standard for a new system and for Sanitary Survey.

## 2.9 MONITORING EQUIPMENT

Water treatment plants ~~should~~ shall be provided with equipment (including recorders, where applicable) to monitor the water as follows:

- ~~a. Plants treating surface water and ground water under the influence of surface water should have the capability to monitor and record turbidity, free chlorine residual, water temperature and pH at locations necessary to evaluate adequate CT disinfection, and other important process control variables as determined by the reviewing authority. Continuous monitoring and recording may be required.~~
- ~~ba.~~ Plants treating ground water using iron removal and/or ion exchange softening ~~should~~ shall have the capability to monitor and record free chlorine residual.
- ~~eb.~~ Ion exchange plants for nitrate removal ~~should~~ shall continuously monitor and record the treated water nitrate level.
- Use as a Design Standard for a new system and for Sanitary Survey.

## 2.14 PIPING COLOR CODE

- To facilitate the identification of above ground piping in treatment plants and pumping stations ~~it is recommended that~~ of a water supply system, the following color scheme shall be utilized:

### Water Lines

Raw or Recycle	Olive Green
Settled or Clarified	Aqua
Finished or Potable	Dark Blue

## Chemical Lines

Alum or Primary Coagulant	Orange
Ammonia	White
Carbon Slurry	Black
Chlorine (Gas or Solution)	Yellow with Green Band
Chlorine Dioxide	Yellow with Violent Band
Fluoride	Light Blue with Red Band
Lime Slurry	Light Green
Ozone	Yellow with Orange Band
Phosphate Compounds	Light Green with Red Band
Polymers or Coagulant Aids	Orange with Green Band
Potassium Permanganate	Violent
Soda Ash	Light Green with Orange Band
Sulfuric Acid	Yellow with Red Band
Sulfur Dioxide	Light Green with Yellow Band
Backwash Waste	Light Brown
Sludge	Dark Brown
Sewer (Sanitary or Other)	Dark Gray

## Other

Compressed Air	Dark Green
Gas	Red
○ <a href="#">Reclaimed Water</a>	<a href="#">Purple</a>
Other Lines	Light Gray

- In lieu of the color coding of pipes as described above, all pipes may be painted similar colors as long as each and every pipe is banded and labeled at 5 foot intervals with the name of the liquid or gas clearly displayed on the pipe. Arrows indicating the direction of flow should be included in this labeling or other method approved by the State Health Officer.
- ~~For liquids or gases not listed above, a unique color scheme and labeling should be used. In situations where two colors do not have sufficient contrast to easily differentiate between them, a six inch band of contrasting color should be on one of the pipes at approximately 30 inch intervals. The name of the liquid or gas should also be on the pipe. In some cases it may be advantageous to provide arrows indicating the direction of flow.~~
- Use as a Design Standard for a new system and for Sanitary Survey.

## 2.15 DISINFECTION

All wells, pipes, tanks, and equipment which can convey or store potable water shall be disinfected in accordance with current AWWA procedures. Plans or specifications shall outline the procedure and include the disinfectant dosage, contact time, and method of testing the results of the procedure.

- Use AWWA Standards - AWWA C651 Disinfecting Water Main, AWWA C652 Disinfecting of Water-Storage Facilities, AWWA C653 Disinfection of Water Treatment Plants and AWWA C654 Disinfection of Wells.
- Use as a Design Standard for a new system and for Sanitary Survey.

## 2.19 SECURITY

- Security measures including, but not limited to the requirements of §315.A and 327.A.13 of this Part, shall be installed and instituted ~~as required by the reviewing authority.~~ Other appropriate design measures to help ensure the security of water system facilities shall be incorporated. Such measures, as a minimum, shall include means to lock all exterior doorways, windows, gates and other entrances to source, production, treatment, pumping and water storage facilities. Other measures may include fencing, signage, close circuit monitoring, real-time water quality monitoring, and intrusion alarms, as well as safety measures to prevent tampering with any electronic, computer or other automated system which may operate or assist in the operation of the water supply system.
- Use as a Design Standard for a new system and for Sanitary Survey.

- For design of new facilities. [Additional Information/Suggestion concerning Security: On, June 12, 2002 the federal *Public Health Security and Bioterrorism Preparedness and Response Act of 2002 - Title IV, Section 401*, amended the federal *Safe Drinking Water Act (42 USC 300f, et seq.)* by inserting Section 1433 (42 USC 300i-2). In this amendment, each community water system serving a population of greater than 3,300 persons is required to conduct an assessment of the vulnerability of its system to a terrorist attack or other intentional acts intended to substantially disrupt the ability of the system to provide a safe and reliable supply of drinking water. The vulnerability assessment is required to include, but is not be limited to, a review of pipes and constructed conveyances, physical barriers, water collection, pretreatment, treatment, storage and distribution facilities, electronic, computer or other automated systems which are utilized by the public water system, the use, storage, or handling of various chemicals, and the operation and maintenance of such system. Public water systems were required to submit their vulnerability assessment directly to the USEPA The deadline for such submittal has since passed. For any new additions or substantial renovations to existing public water systems, information gleaned from such assessment should be utilized to install and institute security measures It appears that 42 USC 300i-2 does not directly address the need for new public water systems to conduct a vulnerability assessment prior to operation; therefore, DHH-OPH urges and requests that any such proposed new public water system, particularly those which intend to serve a population of greater than 3,300 persons,, consult ,with the Public Water Supply Supervision (PWSS) program of the Region VI Office of the USEPA.]
- Use as a Design Standard for a new system and not for Sanitary Survey.

## 2.20 FLOOD PROTECTION

- ~~Other than surface water intakes, all water supply facilities and water treatment plant access roads shall be protected to at least the 100-year flood elevation or maximum flood of record, as requires by the reviewing authority. A freeboard factor may also be required by the reviewing authority.~~
- To be determined by the regulating/governing authority.



SUBCOMMITTEE RECOMMENDATIONS for committee deliberation:

○ 2.0 GENERAL

- ~~The design of a water system or treatment process encompasses a broad area. Application of this part is dependent upon the type of system or process involved.~~

2.1 DESIGN BASIS

The system including the water source and treatment facilities shall be designed for maximum day demand at the design year.

- Use as a Design Standard for a new system and not for Sanitary Survey.

2.2 PLANT LAYOUT

Design shall consider:

- a. functional aspects of the plant layout;
  - b. provisions for future plant expansion;
  - c. provisions for expansion of the plant waste treatment and disposal facilities;
  - d. access roads;
  - e. site grading;
  - f. site drainage;
  - g. walks;
  - h. driveways;
  - i. chemical delivery;
- Use as a Design Standard for a new system and not for Sanitary Survey.

2.4 LOCATION OF STRUCTURES

- The appropriate regulating authority must be consulted regarding any structure which is so located that normal or flood stream flows may be impeded.
- Use as a Design Standard for a new system and not for Sanitary Survey.

○ ~~2.7 SHOP SPACE AND STORAGE~~

- ~~Adequate facilities should be included for shop space and storage consistent with the designed facilities.~~

## 2.8.2 Physical facilities

- Where laboratory facilities are provided each public water system shall have ~~Ss~~ufficient bench space, adequate ventilation, adequate lighting, storage room, laboratory sink, and auxiliary facilities shall be provided. Air conditioning may be necessary.
- Use as a Design Standard for a new system and for Sanitary Survey.

## 2.10 SAMPLE TAPS

Sample taps shall be provided so that water samples can be obtained from each water source and from appropriate locations in each unit of operation of treatment, and from the finished water. Taps shall be consistent with sampling needs and shall not be petcock type. Taps used for obtaining samples for bacteriological analysis shall be of the smooth-nosed type without interior or exterior threads, shall not be of the mixing type, and shall not have a screen, aerator, or other such appurtenance.

- Use as a Design Standard for a new system and for Sanitary Survey.

## 2.11 FACILITY WATER SUPPLY

- The ~~facility~~ water ~~treatment plant's supply~~ service connection line and the ~~plant~~ finished water sample tap line shall both be supplied from a source of finished water at a point where all chemicals have been thoroughly mixed, and the required disinfectant contact time has been achieved (see Section 4.4.2). Please note that, in some cases, the take off point of the water treatment plant's service connection line and the finished water sample tap line may be downstream of the plant itself but at or before the first customer. There shall be no cross-connections between the ~~facility~~ water ~~treatment plant's supply~~ service connection line or the finished water sample tap line and any piping, troughs, tanks, or other treatment units containing wastewater, treatment chemicals, raw or partially treated water.

- Use as a Design Standard for a new system and for Sanitary Survey.

## ○ 2.12 WALL CASTINGS

- ~~Consideration shall be given to providing extra wall castings built into the structure to facilitate future uses whenever pipes pass through walls of concrete structures.~~

## ○ 2.13 ~~METERS~~ FLOW MEASUREMENTS

- All public water supplies systems shall have an acceptable means of measuring the flow from each source, the washwater, the recycled water, any blended water of different quality. ~~, and the finished water.~~
- Use as a Design Standard for a new system and not for Sanitary Survey.

## 2.16 OPERATION AND MAINTENANCE MANUAL

- An operation and maintenance manual including a parts list and parts order form, operator safety procedures and an operational trouble-shooting section shall be supplied to the water works-supply system as part of any proprietary unit installed in the facility.
- Use as a Design Standard for a new system and not for Sanitary Survey.

## 2.17 OPERATOR INSTRUCTION

Provisions shall be made for operator instruction at the start-up of a plant or pumping station.

- Use as a Design Standard for a new system and not for Sanitary Survey.

## ○ 2.18 SAFETY

- ~~Consideration must be given to the safety of water plant personnel and visitors. The design must comply with all applicable safety codes and regulations that may include the Uniform~~

~~Building Code, Uniform Fire Code, National Fire Protection Association Standards, and state and federal OSHA standards. Items to be considered include noise arresters, noise protection, confined space enter, protective equipment and clothing, gas masks, safety showers and eye washes, handrails and guards, warning signs, smoke detectors, toxic gas detectors and fire extinguishers.~~

- To be determined by the regulating/governing authority.

- ~~2.21 CHEMICALS AND WATER CONTACT MATERIALS~~

- ~~Chemicals and water contact materials shall be approved by the reviewing authority or meet the appropriate ANSI/AWWA and/or ANSI/NSF standards.~~
- Handled in Chapter 5.

## 2.22 OTHER CONSIDERATIONS

Consideration must be given to the design requirements of other federal, state, and local regulatory agencies for items such as energy efficiency, water conversation, environmental impact, safety requirements, special designs for the handicapped, plumbing and electrical codes, construction in the flood plain, etc.

- Use as a Design Standard for a new system and not for Sanitary Survey.

## POLICY STATEMENTS

### Policy Statement On Pre-Engineered Water Treatment Plants

- Use as a guide for design.

### Policy Statement on Automated/Unattended Operation of Subsurface Water Treatment Plants

- Use as a guide for design.

## Policy Statement on Infrastructure Security for Public Water Supplies

- [Use as a guide for design.](#)